CLAIMS

1. A folded optical waveguide structure comprising a substrate supporting a waveguide slab and an array of laterally spaced grating waveguides extending from the slab along the substrate to propagate optical signals to and from a reflective surface of a mirror member disposed at an end of the substrate; and a thermally conductive body interposed between the mirror member and the substrate, the thermally conductive body being so dimensioned and having a thermal coefficient of expansion such that temperature induced changes in wavelengths of said optical signals propagated along the grating array waveguides and reflected from the reflective surface of the mirror member are substantially compensated by dimensional changes of the body tilting the mirror member with respect to the grating waveguides at said end of the substrate.

2. A folded optical waveguide structure according to claim 1, wherein said temperature induced changes in wavelengths include changes resulting from changes in the index of refraction of said waveguide gratings.

3. A folded optical waveguide structure according to claim 1, wherein said temperature induced changes in wavelengths include changes resulting from the thermal coefficient of expansion of said mirror member.

4. A folded optical waveguide structure according to claim 1, wherein the thermally conductive body is supported by the mirror member.

5. A folded optical waveguide structure according to claim 4, wherein the thermally conductive body is mounted in a recess in the mirror member.

6. A folded optical waveguide structure according to claim 1, including a layer of thermal matching material between the end of the grating waveguide array and the reflective surface, and wherein said tilting of the mirror member changes the optical path lengths between the grating waveguides and the reflective surface of the mirror member.

7. A folded optical waveguide structure according to claim, wherein the thermally conductive body is a metal body.

8. A folded optical waveguide structure according to claim 1, wherein the thermally conductive body comprises copper or aluminum.

9. A folded optical waveguide structure according to claim 1, wherein the reflective surface comprises a coating on a glass support member.

10. A folded optical waveguide structure according to claim 1, wherein the thermally conductive body is laterally offset from one side of the grating array and the mirror member tilts about an axis offset from the opposite side of the grating array.

11. A folded optical waveguide structure comprising a substrate supporting a waveguide slab and an array of laterally spaced grating waveguides extending from the slab along the substrate to propagate optical signals to and from a reflective surface of a mirror member disposed at an end of the substrate; and a thermally conductive body interposed between the mirror member and the substrate, the thermally conductive body being so dimensioned and having a thermal coefficient of expansion such that temperature induced changes in wavelengths of said optical signals at the interface between the grating waveguides and the reflecting surface of the mirror member are substantially compensated by dimensional changes of the

body tilting the mirror with respect to the substrate to change optical path lengths between the grating waveguides and the reflecting surface.

12. A folded optical waveguide structure according to claim 11, wherein the thermally conductive body is laterally offset from one side of the grating array and the mirror member tilts about an axis offset from the opposite side of the grating array.

13. A folded optical waveguide structure according to claim 11, including a layer of thermal matching material between the end of the grating waveguide array and the reflective surface, and wherein said tilting of the mirror member changes the optical path lengths between the grating waveguides and the reflective surface of the mirror member.

14. A folded optical waveguide structure comprising a semiconductor substrate supporting a waveguide slab and an optical grating comprising laterally spaced waveguides extending from the slab along the substrate, said waveguides comprising a core layer surrounded by cladding, said waveguides terminating at an end face of the substrate at a reflective surface of a mirror member to support propagation of optical signals to and from the reflective surface of the mirror member along the respective grating waveguides; and a thermally conductive body interposed between part of the mirror member and the substrate, the thermally conductive body being laterally offset from the optical grating waveguides, the thermal coefficient of expansion and dimensions of the thermally conductive body being such that thermally induced changes in the wavelengths of said optical signals caused by changes in refractive index of the grating waveguides are substantially compensated by tilting of the mirror member body with respect to the substrate resulting from thermally induced dimensional changes of the thermally conductive body, said tilting causing change in optical path lengths between the waveguide gratings and the reflective surface.

15. A folded optical waveguide structure according to claim 14, including a layer of thermal matching material between the end of the grating waveguide array and the reflective surface, and wherein said tilting of the mirror member changes the optical path lengths between the grating waveguides and the reflective surface of the mirror member.

16. A folded optical waveguide structure comprising a semiconductor substrate supporting a waveguide slab and an optical grating comprising laterally spaced waveguides extending from the slab along the substrate, terminating at one end face of the substrate at a reflective surface of a mirror member, such that optical signals propagated along the grating waveguides to the reflective surface are reflected and returned along the same respective waveguides; and a thermally conductive body mounted in a recess in the mirror member to project beyond the mirror member and abut the end face of the substrate, the thermally conductive body being laterally offset from the optical grating waveguides, the thermally conductive body having a thermal coefficient of expansion and being so dimensioned and positioned relative to the substrate that changes in ambient temperature cause dimensional changes in the thermally conductive body effective to tilt the mirror member away from or towards the substrate thereby to change optical path lengths between the grating waveguides and the reflecting surface to substantially compensate thermally induced changes in wavelengths of optical signals propagating along the grating waveguides.

17. A folded optical waveguide structure according to claim 16, including a layer of thermal matching material between the end of the grating waveguide array and the reflective surface, and wherein said tilting of the mirror member changes the optical path lengths between the grating waveguides and the reflective surface of the mirror member.

18. A folded optical waveguide structure comprising a semiconductor substrate supporting a waveguide slab and an optical grating comprising laterally spaced waveguides extending from the slab along a surface of the substrate, said waveguides comprising a core layer surrounded by cladding, said grating waveguides terminating at one end face of the substrate, a mirror member mounted to the substrate, said mirror member having a reflective surface facing the grating waveguides and spaced therefrom by an index of refraction matching layer; and a thermally conductive body interposed between the mirror body and said substrate, said thermally conductive body supported by the mirror member and laterally offset from one side of the optical grating waveguide array, the thermally conductive body being so dimensioned and positioned relative to the substrate that changes in ambient temperature cause dimensional changes in the thermally conductive body effective to tilt the mirror member away from or towards the substrate about an axis on the opposite side of the grating waveguide array thereby to change optical path lengths across the index of refraction matching layer between grating waveguides and the reflective surface, thereby substantially to compensate changes in wavelengths of optical signals propagating along the grating waveguides caused, at least in part, by thermally induced changes in index of refraction of waveguides in the grating array.